

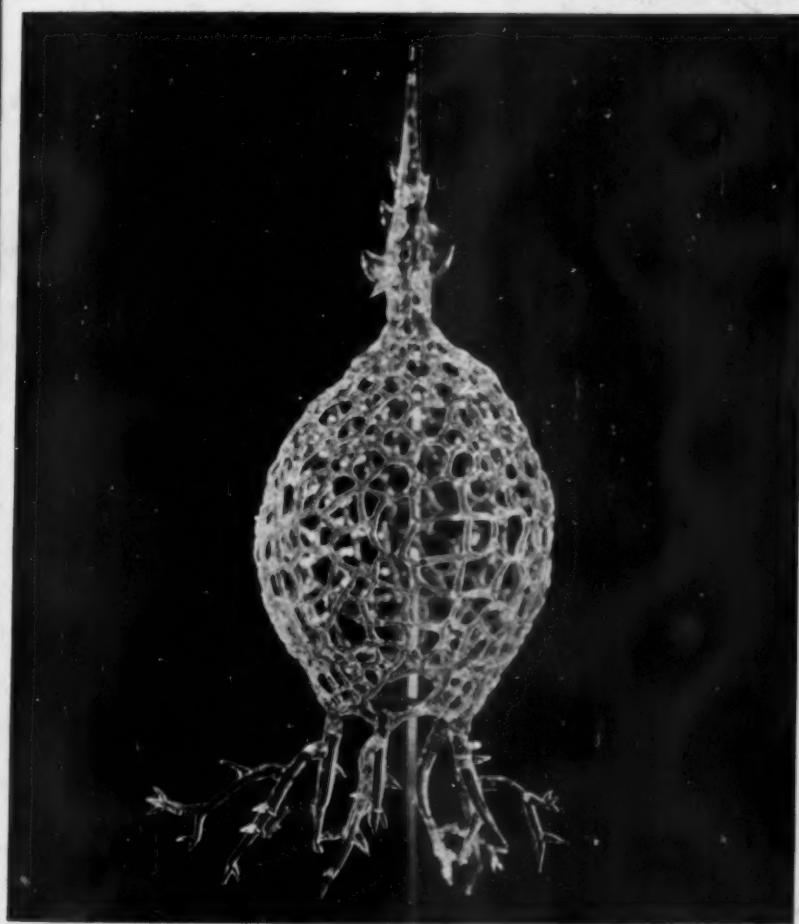
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



APRIL 3, 1937

Life in Glass

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DO YOU KNOW?

The birth rate in England has been falling for about 60 years.

In the cactus the making of food is done by the stem, instead of by leaves as in most plants.

Government scientists are trying to develop a kind of broom corn that will make good brooms and also yield seed palatable to livestock.

So great is the wild alligator's fear of man that humans may safely go bathing in waters inhabited by these animals, says a well-known zoologist.

Drought is blamed as the main reason for locust plagues in China, by one Chinese scientist who checked droughts and locust records back 300 years.

Cattle fed on a wheat diet need three additions to their menu for health—cod liver oil for vitamin A, salt for chlorine, and bone meal to provide calcium.

Medieval bronzes made in the mysterious African Kingdom of Benin are so beautifully designed and executed that a German scholar has said: "Benevenuto Cellini himself could not have made better casts, nor anyone else before or since to the present day."

Woodpeckers have long barbed tongues, useful in picking up insects.

The first bag-limit law for the protection of game was enacted by Iowa in 1878.

Guacharo tobacco, famous cigar leaf discovered less than 50 years ago, can only be grown in a certain part of Venezuela.

Western Indians used to cool the air in hot weather by wetting piles of straw; modern Californians use wet air filters and large ventilating fans.

Romans adorned some boats with animal heads at bow and stern, as Norsemen did, but whether Scandinavians got the idea from Romans is not discovered.

In ancient Egypt and Babylonia, learned books were not valued so much for new ideas or knowledge they contained as for the old, time-tried lore they preserved.

Stone tools and other relics of a tribe of Old Stone Age hunters in Europe have been given to Mount Holyoke College in Massachusetts by the National Museum in Budapest.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

ANATOMY-PHYSIOLOGY

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Do X-rays have a uniform effect on different organisms? p. 216.

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How does Frank Long make his glass models of microscopic forms of life? p. 214.

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MEDICINE

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What did the brains of mice tell physicians about winter resistance to disease? p. 211.

Why did scientists join mice so that they would have a common blood supply? p. 222.

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Did bugs exist in the days of the giant dinosaurs? p. 217.

PHYSICS

For what purpose was the world's highest laboratory established? p. 220.

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Why are the radio waves so crowded? p. 223.

MEDICINE

Body Fights Germs Harder In Winter Than Summer

Report Finding of Chemical Important in Body's Fight Against Disease; Killing of Cancer Cells Explained

THE BODY puts up a stiffer fight against invading disease germs in winter than in summer.

This discovery, accidentally made from observation of the marks of the battle on the brain tissues of mice that had encephalitis, was reported by Drs. R. D. Lillie, R. E. Dyer, Charles Armstrong and Joseph G. Pasternack of the U. S. National Institute of Health, Washington, to the meeting of the American Association of Pathologists and Bacteriologists in Chicago.

Whether the fiercer fighting in cold weather means that the body is more successful in resisting germ invasion is not yet known. That is the next problem for investigation. Meanwhile the discovery reported here gives an entirely new explanation for the old idea of a relation between climate and infectious disease.

Climate does not affect infection or transmission of disease, but exerts its influence on the internal or tissue reactions of infected animals to disease, Dr. Lillie and associates explained. These reactions, termed inflammatory changes, are part of the body's defense mechanism.

At warm temperatures, apparently, the standing army of defensive antibodies in the blood stream are sufficient to fight invading disease germs, Dr. Lillie suggested as a tentative explanation of the findings. When the temperature gets low, the reserves are called out, and these are the mechanisms within the body's cells which produce inflammation when they go into action.

Brains of Mice

Brains of mice that had encephalitis of the type epidemic in St. Louis in 1933 and 1934 gave the first hint that temperature affected the body's defense mechanism. The research had started in the winter and the reaction to the infection seen in the mice brains was graded severe, moderate and slight. As the seasons changed, fewer moderate and severe reactions were noted and in

summer even slight reactions were few. In August the severe and moderate reactions began to increase again.

The evident relation to temperature suggested further studies, which were made with "hot" and "cold" mice infected with encephalitis and with guinea pigs infected with typhus fever and kept at varying temperatures.

Discovers Chemical

A chemical, tentatively named leukotaxine, which plays an important part in the body's fight against disease, has been discovered by Dr. Valy Menkin, of Harvard Medical School.

Reporting to the meeting of pathologists and bacteriologists, Dr. Menkin said that the chemical is produced by injured cells of the body but not by normal cells; that it causes increased leakage of fluid from small blood vessels, seen as the swelling in inflamed

tissues; that it causes migration of fighting white blood cells to the point of injury; that it is a crystalline, water-soluble substance, as yet unidentified chemically.

No Danger

Encouragement for those who use benzedrine sulfate to decongest their noses during a cold appears in the studies reported by Drs. W. E. Ehrlich and E. B. Krumbhaar of Philadelphia. These studies show the drug has a wide range of safety.

This chemical, or the similar benzedrine hydrochloride has other uses besides decongestion of nose, throat and ears. It is like adrenalin and ephedrine, and like them increases the blood pressure. Benzedrine, however, generally works more slowly and longer than ephedrine and adrenalin. It is said also to stimulate the brain, both in causing excitement, preventing sleep, relieving fatigue or narcoleptic (sleepy attacks) symptoms and shortening anesthesia from amytal.

Experimental studies have lagged behind the clinical use of this important drug, and the Philadelphia scientists undertook to determine the safety limits of the drug and whether its continued use would have any bad effects. Working with rats, they found that even when given over long periods, the drug



DATES WEAR RAINCOATS

Not good-looking young fellows in slickers. Just big clusters of the California palm-fruits covered with little individual tents of tough waxed paper to keep off dew and drops from any untimely shower that might fall during the ripening period. Even an almost microscopic wetting might cause the spoilage of a fifty-pound cluster of dates.

produced no harmful structural changes in the internal organs. Doses from ten to hundreds of times the medicinal dose produced little more than an exaggeration of the remedial effect, and had no lasting ill effects.

Fatal Transformation

Like the good fairy who changed the dreadful ogre into stone, X-rays destroy certain kinds of cancer cells by transforming them into abnormal cells with calcified or stony nuclei.

The fatal transformation of cancer cells by X-rays was described by Drs. Perry J. Melnick and Albert Bachem of Chicago.

The transformation is known scientifically as a mutation or variation. It has been known for some time that X-rays could cause mutations in plants and animals, but it remained for Drs. Perry and Bachem to discover that this is one of the ways in which X-rays cure cancer.

With large single doses of X-rays, suitable for treatment of certain tumors, the tumor or cancer cells disintegrate by dying. However, with small repeated doses of X-rays, a method suitable for certain other types of tumors, the X-rays induce changes in the tumor cells resembling lethal mutations.

"The cells," the Chicago scientists explained, "are transformed into abnormal forms which are unable to survive. In a series of rat tumors, the tumor cells were transformed by X-rays into abnormal giant cells which disintegrated in a specific manner by calcification of their nuclei."

Won't Cause Cancer

Dusty air, such as miners, stone cutters and many others work in all day long, is a health hazard and may cause diseases like silicosis, but it is probably not in this country a cause of lung cancer.

This is the conclusion of a study reported by Drs. Arthur J. Vorwald and John Karr of Saranac Laboratory, Saranac Lake, N. Y.

The tendency to regard inhaled dust as a cause of lung cancer was prompted, Drs. Vorwald and Karr pointed out, by reports from mining districts in Europe. The number of cases of cancer among miners there is unusually high. The ore dust in these mines is radioactive and therefore induces changes in the lungs which eventually develop into cancer.

These observations do not justify incriminating all dusts as cancer-causing. The great majority of the dusts are not radioactive, the Saranac scientists pointed out, and do not, so far as is

known, contain cancer producing substances. If they did, the amount of lung cancer in men and experimental animals exposed to occupational dusts for long periods of time should be unusually high. A survey of patients suffering from pneumonokoniosis, the lung condition that is due to breathing dusty air, and observations on patients and animals at the Saranac Laboratory, Drs. Vorwald and Karr say, do not support this view.

BALLISTICS

Determine Speed of Shells By Firing Through Light

Series of Light Beams Are Intersected by Projectile, Progress of Which is Recorded by Photoelectric Cells

AN ARTILLERY shell crashing through invisible curtains of light is the newest means of determining the speed of projectiles developed by scientists at the National Research Laboratories of Canada in Ottawa. Particular merit of the system is its portability which enables it to be used in the field, to bring added accuracy to computations of range in actual combat.

Light beams, mirrors, photoelectric cells and sensitive recording mechanism are the equipment which makes possible

Pneumonokoniosis itself, however, is one of the important occupational hazards in many industries throughout the country. Silicosis is one form of pneumonokoniosis, due to inhaling dust containing particles of silica. Few persons die of pneumonokoniosis or silicosis, but these conditions make the sufferer more liable to develop tuberculosis or other lung infections.

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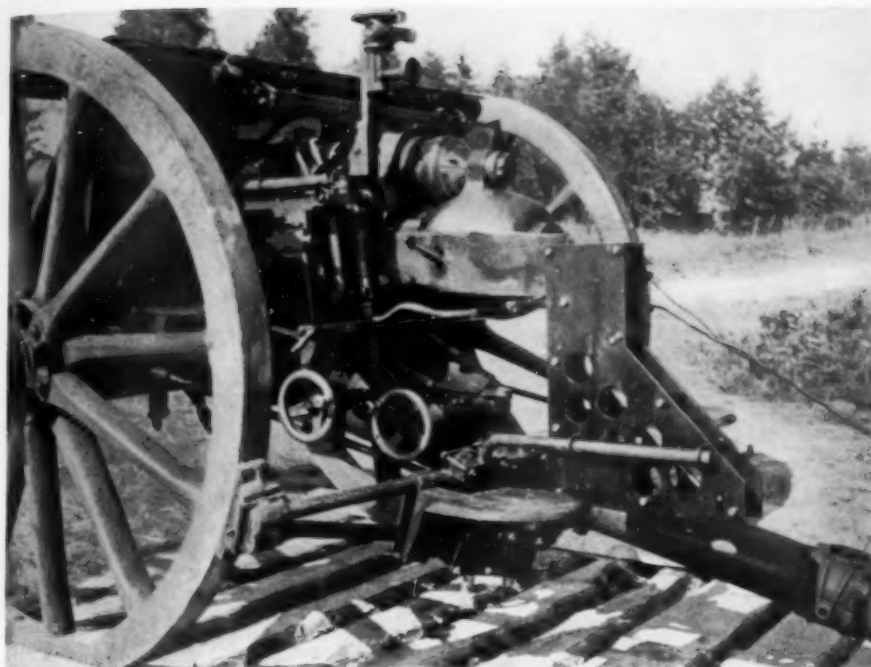
the new development of Dr. D. C. Rose, physicist in the division of physics and electrical engineering of the Canadian National Research Laboratories.

In effect the artillery shell passes down a narrow tunnel and every 50 feet intersects a beam of light falling on a photocell. Momentarily the shell blocks off the light beam and this decrease in light intensity cuts down the electrical output of the cell. By an amplifying system this electrical change produces a permanent record on photographic film.



MEASURING SPEED OF SHELLS

Dr. D. C. Rose, National Research Laboratories of Canada, supervising the installation of his photoelectric device. A light beam from the small box at the bottom of the frame is reflected and falls on the photoelectric cell at top of frame.



FIRING MECHANISM

An electrically controlled mechanism is attached to an ordinary piece of field artillery for Dr. Rose's tests.

In field tests at the military camp at Petawawa, Dr. Rose set up metal frames whose upper and lower surfaces consisted of mirrors. A beam of light started from the bottom and was reflected back and forth across the space between the mirrors until its ray finally fell on a photoelectric cell concealed in a small box attached to the upper part of the frame. Thus the entire space within the frame was filled with a light beam which could be blocked out by the on-rushing shell.

Fires Shell

A series of four of these frames were carefully lined up before an artillery piece which at a known, and automatically registered, instant fired its shell through the frames.

Initial firing was merely through paper screens to test the alignment of the gun for its "jump" characteristics and to demonstrate that the automatic firing mechanism was working accurately. In subsequent tests the light beams and photocell frames were employed.

The timing of the speeding shells—which were found to be moving with a velocity of 1585 to 1600 feet a second—was accomplished by having the weakened photocell current swing a sensitive galvanometer. A beam of light striking a small mirror on this instrument was then reflected back to a moving motion

picture film. Simultaneously tiny markings created by a constant pitch tuning fork gave time signals on the film. Some 497.7 of these marks represented one second in actual time.

Old Problem

Ever since man fired his first gun determinations of the bullet or shell velocity have been a major problem for military officers. A rough average velocity from the time the shell left the gun until it struck its target could, of course, be obtained by a stop watch and a measurement of the range along the ground. From these facts it was easily possible to compute the length of the idealized parabolic path of the shell through its arc, and hence determine the average velocity. But the effect of air resistance during flight and other factors quickly showed that this was a theoretical answer which has only a fair resemblance to the real facts of speed.

Pioneers in the problem of projectile speed were Robins, 1742, Hutton in 1775-88 and Woolwich and Didion in 1839-40. All these men worked with the so-called ballistic pendulum invented by Robins. Hutton's method, for example, consisted in measuring the velocity of the cannon ball at the muzzle of the gun and at a known distance. The muzzle velocity was obtained by measurements on the recoil of the gun and the

velocity at a distance by having the cannon ball strike a heavy suspended pendulum and raise it a measurable height.

Shell Is Magnetized

American experiments late in the 1920's consisted of firing a magnetized shell through a series of solenoid coils thereby generating a slight electric current in the coils. The recording instrument was an oscillograph.

Another method, used widely to determine the air resistance of a shell, if not its speed, is that of wind tunnel tests. The shell, or a model of it, is placed in a wind tunnel and air is driven past it at high speeds approaching or equaling those attained in actual flight.

Object of all the tests is to obtain accurate data which can be correlated into the so-called ballistic tables used in wartime, where the distance of the target in yards or feet means setting the gun in a certain direction and pointed at a given elevation.

Dr. Rose's new method, because of its semi-portable character and its freedom from the need for an actual testing laboratory, can be carried into a combat zone if necessary and attain an accuracy comparable with more elaborate equipment operated in peacetime.

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RADIO

Scientists Still Seeking Cause of Interstellar Static

SCIENCE is still on the search for the cause of strange radio disturbances that come from interstellar space.

Four years ago Dr. Karl G. Jansky of the Bell Telephone Laboratories found a sort of continuous static that came from somewhere about the center of the great system of stars in which we live. Its wavelength was 14.6 meters.

Drs. Fred L. Whipple and Jesse L. Greenstein of Harvard College Observatory have investigated the idea that the radiation comes from absorbing material at the center of our stellar galaxy which could act as what the scientists call "black bodies" and radiate at low temperatures. After elaborate computations, set forth in the current Proceedings of the National Academy of Sciences, they conclude that the amount of radio disturbance observed could not be accounted for in this way.

So the solution of this radio mystery is still being sought. The next clue being investigated is whether the disturbance occurs on other wavelengths.

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BIOLOGY

Beauty in Glass

**Delicate and Lovely is the Handicraft of Frank Long
Who Models for Scientists Life Under the Microscope**

By DR. FRANK THONE

See Front Cover

VENETIAN princes vied with each other, in the rich, romantic days of long ago, for the services of artists who could do honor to their patrons by creating enduring beauty. In silver and gold, in bronze and in marble they wrought; in exquisite and costly gems and in the larger jewelry of mosaic wall and pavement. No material was too rare or too far for the Venetian galley fleets to seek, that the lords of the Sea-City might without stint serve the servants whom they were proud to address as "master."

But though the fingers of Venice reached from the bazaars of the East to the amber beaches of the North, from the metal-yielding hills of Spain to the mysterious ivory-rich lands of Africa, there was still one common thing that certain of the city's craftsmen were able to ennoble to full peerage with the world's farthest-brought treasure, a fragile thing that has been for generations a firm foundation-stone in the structure of the fame of Venice.

Glass.

Glass, that could rival in colors the rarest gems from India, the richest tapestries of Damascus. Glass, obedient to flame as gold was obedient under the little hammers of Cellini. Glass, translucent and glowing as the sunsets over the Adriatic. Glass, in grace and beauty of form worthy of the noble ladies who offered the goblets to fortunate guests.

Glorified

Venice took common glass and glorified it. And glass made noble addition to the glory of Venice.

In our America of these later days there is another mighty city of commerce and craftsmanship, as unlike Venice as our Industrial Age is unlike the Renaissance. It lies not by the flat sea, but stands on steep hills. Its commerce comes and goes not in stately galleys but on thundering freight trains and slow river barges. Its skies are not spread with a thousand white sails but take smoke from a thousand chimneys. Yet

for all the chasm of contrast that lies between them, old Venice and new Pittsburgh have at least one prime item in common.

Glass.

To be sure, the glass of Pittsburgh is not as the glass of Venice. The hand-wrought glass of Venice was the product of the skilled few for the wealthy few. It was the glass of aristocracy, delicate, exquisite, exclusive. The machine-wrought glass of Pittsburgh is the product of the many for the many. It is the glass of democracy, strong in great sheets, yards in area, shining in windows, in chariots such as no Renaissance prince ever knew, bulging with chemical wares such as no alchemist of old time ever dreamed of. Massive glass rivals Pittsburgh's massive steel as delicate glass once rivalled Venice's exquisitely wrought gold.

Yet even in modern Pittsburgh, the city of glass by the ton, by the trainload, the secret of delicacy, of finesse, in glass is not forgotten. Real artists in glass ply

their craft there, producing many lovely things, that a Venetian noblewoman need not have despised. And one of them, at least, Frank Long of the Carnegie Museum, has turned his skill to the production of glass sculptures of things that Venetian sailors may have marvelled at when they went down to the sea in ships, and of other things that were hidden from the sight of even the wisest man of the days of the Doges.

Accuracy

Frank Long makes in glass accurate pictures of the lesser creatures of land and sea, the beauty that floats in the water, the wonder that can be seen only when a trained eye looks through a microscope. His glass models of the unnoticed marvels of life in the common world around us are becoming objects of scientific pilgrimage.

The marvel of Mr. Long's work does not lie in anything he uses, either tools or materials. The material is nothing but common soft glass, such as is used in bottles and in old-fashioned window-panes. It is not even as high-toned as the plate glass in your motor-car windows. Most of his specimens are made entirely of pieces of this glass, molded soft and



AT WORK

An artist-scientist who works on unusual subjects, in an unusual medium: Frank Long of the Carnegie Museum, Pittsburgh, in his studio-laboratory.



BATTLE

A little war of conquest, modeled in glass. The light-colored ants are the aggressive red Amazon ant species. They are fighting the black ants and robbing their nursery, to carry off the helpless young into slavery.

welded together with a fine blow-pipe flame. The only other material he uses is Canada balsam, the sticky stuff that oozes out of fir trees; some of the more complex jobs he fastens together with this.

The tools he works with are equally simple—a few sticks of carbon, a pair of tweezers for pinching up points and sharp edges in the soft glass, a gas burner and a small blowpipe for picking out and directing a delicate tongue of flame where he needs it.

The colors of the animals and plants he images forth are right in the glass itself. That makes for permanency such as no painting could boast. Coloring glass is an art that began in Egypt, and has continued to be perfected through Greco-Roman and Medieval times, down to the present day. So Mr. Long has as flexible a choice of colors at command as any artist can mix on his palette.

Standard Forms

His work is further simplified by the number of standard shapes and sizes of glass rods, tubes, sheets, and other pieces available—and by the very convenient fact that in nature most shapes are modifications or combinations of the same basic forms. Legs are basically rods, wings are flat sheets, heads, eyes, eggs are spheres or ovoids, antennae and bristles are threads. So the artist first makes the basic shape and then pushes and pulls, bends and molds, until the nature-modification is faithfully reproduced.

For vari-colored organs or their combinations, he uses different colored pieces, welding them together in the blowpipe flame or gluing them together with the Canada balsam. Of course he welds wherever he can, for those joints are permanent. But in some close corners the use of the flame would melt something that has already been set up, so here he must use the adhesive gum.

World of Water

So much for Frank Long's artistic technique. His scientific models he chooses from all the world, though it is true he has rather a preference for the microscopic world of the waters. On his worktable he has a microscope always at hand. He puts on the slide a drop of water containing the tiny plants or animals he wants to depict in glass. He focuses the instrument, takes a quick and searching look. Then like a painter turning to his canvas he quickly puts in some quick strokes, pushings, pinchings, on the soft glass he is holding above the flame. Then another look, and more moldings and modelings. Then a selection of a new piece of glass of different color, as he comes to a differently colored part of the creature. Finally, the long, delicate, difficult job of putting the parts together. Then, with a new masterpiece mounted, labeled, and set in its place in the museum, on to new worlds to conquer in glittering glass.

Some of the glass models in other museums are already famous. But Mr. Long has chosen a number of natural

models in fields other museum artists in glass have not yet touched. One group is a series of common things that we meet as daily annoyances, not suspecting the beauty that may be out of common eyesight-range on a bit of mouldy bread or a spoiled orange. For the common moulds are fungi, related to mushrooms and puffballs but lower in the evolutionary scale and simpler in structure. As seen under the microscope, and as depicted in the large in Mr. Long's glass, they consist of branching white threads, bearing here and there oddly-shaped but beautiful clusters of the tiny brown reproducing bodies, or spores.

Still Lower

Even lower in the scale of life, but having a rare beauty nevertheless, are the strange creatures that biologists call the slime-moulds, or more learnedly the myxomycetes or mycetozoa. These things are at the very bottom of the scale of life. They live in damp places in woods and gardens. Most of their lives they are simply formless masses of slimy stuff, like spilled mucilage; though they are often brightly colored in reds, oranges, yellows. But when time for reproduction comes, they form little cylinders of lace, no bigger than a wheat grain but of such delicate workmanship that not even a Flemish lace-maker with her flying bobbins could hope to imitate them. One of these, magnified to more than a foot in height, has been immortalized in glass by Frank Long.

But it is in the microscopic and near-microscopic life of the water that the Pittsburgh artist seems most to delight. The skeletons and shells of one-celled animals and plants intrigue him. Perhaps appropriately so, for many of them are themselves made of silica, which is a prime ingredient of all common forms of glass. He has done, for example, some beautiful large-scale reproductions of one-celled animal skeletons. One of these, shown on the front cover, surmounts an openwork globe of interconnected shining threads with a spiny spire that surely belongs on a fairy palace in Siam—if they have fairies in Siam. Siamese, surely, is his model of a desmid, a one-celled water plant that always has two evenly balanced halves to its shell, as though it were made against a mirror.

Unbelievably complex is a model, of many hundred parts, that Mr. Long has made of a small crustacean, relative of the larger lobsters and crayfish. The creature itself is rather incredible, for what are legs and (Turn to page 218)

BIOLOGY

Fierce Worms Kill Prey With Hollow Spears

"DOG eat dog" is realized in the world of blind life underground, in fierce attack of worm on worm. One group of predatory worms kills its kindred prey with hollow spears that they carry in their mouths, and then suck their victims' body contents through the hollow of the deadly weapon, like a kid absorbing a malted milk.

Scenes from these small but sanguinary dramas are described (*Science*, March 19) by Drs. M. B. Linford and J. M. Oliveira, Pineapple Experiment Station, Honolulu. Their worms, belonging to the great group known as nematodes, were found in soils in Hawaii and other Pacific islands.

One group of these spear-bearing worms has big, heavy weapons with large hollows. So quickly do they suck in the flesh and blood of their victims that the speared worm has no time to struggle.

A second group has slender spears. Their victims might conceivably squirm around violently. This, however, is prevented by the paralyzing action of the slender spear's thrust, apparently due to the saliva of the attacker injected through the hollow shaft.

These strange hunter worms have a certain amount of economic importance, because some of the species that become their prey are feeders on the roots of crop and ornamental plants.

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MATHEMATICS

Princeton Scientist Analyzes Gambling; "You Can't Win"

PROF. John Von Neumann, Institute for Advanced Study mathematician, even applies his science to the gambling table.

He has warned Princeton students in a lecture that it is impossible to win at dice over long periods whether the "ivories" are loaded or not.

The magic "seven-eleven" combination is by far the most frequent throw, he said, but if it doesn't turn up on the first cast, the chances are reversed, and the stakes are as good as lost.

"That leaves a .490 winning average, so the game is not fair," he declared.

"Stone-paper-scissors," a form of gambling that originated among bored convicts and is as old as chess, is Prof. Von Neumann's specialty. This well-known game is won by "making each play the

same number of times, but at random, and your opponent will lose in the long run."

He termed the intellectual pursuit of chess to be merely a game of chance, and said that "white," which has the first move, can always win, although "if 'black' is wise to the theory, he can play defensively and tie 'white'."

Prof. Von Neumann divided "games of chance" into two categories: those like dice where explicit hazards are introduced by rules, and those like chess, poker, and "stone-paper-scissors," where chance is introduced by what the opponent does.

"In the latter type intellectual reasoning is sometimes needed, while in the former no decision is required except whether to bet," he pointed out.

In the case of dice, he showed that since seven can be thrown in six ways and 11 in two, while two, three, and twelve result from only one or two combinations, the conditions are favorable to win on the first throw. But if "seven-eleven" is missed, repetition of the first throw is unlikely, and the seven is now working against the player. The net effect is against the player.

In poker, which he had to simplify considerably to be able to analyze, Prof. Von Neumann stated that chances are one out of 300,000,000 to obtain any certain combination of five cards, although several different combinations satisfy the straight, flush, full-house or four of a kind.

The study of probability in games is mere recreation with Prof. Von Neumann, who has devised "continuous geometry," specialized in mathematical physics, and written an "elementary theory of quantum mechanics." He came to Princeton to teach in 1930 after education at Zurich, Switzerland, and Göttingen, Germany. In 1933 he joined Princeton's newly-organized Institute for Advanced Study.

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GENERAL SCIENCE

63 Guggenheim Fellowships Awarded, Totaling \$130,000

FELLOWSHIPS to 63 students of science and the arts, as well as to writers, musicians, etc., have been awarded for 1937 by the John Simon Guggenheim Memorial Foundation. The total sum granted is \$130,000.

The Guggenheim fellowships were established in 1925 by former U. S. Senator and Mrs. Simon Guggenheim as a memorial to a son.

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IN SCIENCE

ANTHROPOLOGY

Noted French Anthropologist Awarded Mendel Medal

PERE Teilhard de Chardin, noted for his researches on Peking Man, was given the Mendel Medal of Villanova College, Monday night, March 22. This medal is awarded to Catholics who have done notable work in scientific research.

Père Teilhard came to this country to participate in the International Symposium on Early Man, held in celebration of the 125th anniversary of the Philadelphia Academy of Natural Sciences.

Science News Letter, April 3, 1937

BIOLOGY

X-Rays and Neutrons Don't Act Alike on All Life

X-RAYS and neutrons, science's newest subatomic "bullets," vary in their destructive effects on different living things. If a beam of neutrons is twice as damaging as a beam of X-rays when tried on insect eggs, it is not safe to assume that the neutrons will be twice as damaging as the X-rays when fern spores are substituted as the target. Each type of cell seems to have its own differential of susceptibility between neutrons and X-rays.

This is the inference of caution to be drawn from experiments conducted by Dr. Raymond E. Zirkle of the University of Pennsylvania, and Drs. Paul C. Aebersold and Everett R. Dempster of the University of California. (*American Journal of Cancer*, March)

The three researchers exposed three types of living material, fruit-fly eggs, wheat seedlings, and fern spores, to the action of X-rays and neutron streams. They found the destructive effectiveness of neutrons on the fly eggs to be 2.1 times as great as that of X-rays. But with wheat seedlings as targets, the neutrons were five times as effective as the X-rays, while the ratio in the case of the fern spores was 2.5 to 1. Thus although the neutrons always appeared to be more destructive than X-rays the exact relative degree of destruction must be decided separately for each type of living tissue studied.

Science News Letter, April 3, 1937

EN FIELDS

PALAEONTOLOGY

Hundred Million Year Old Bugs at Smithsonian

TWO bugs about a hundred million years old have been received from eastern Colorado by the Smithsonian Institution, and have been studied by Paul W. Oman of the U. S. Department of Agriculture. Mr. Oman states that one appears to be a giant leaf-hopper, the other probably related to the present-day squash-bugs. Both fossils were wing-prints in sandstone.

Special interest attaches to these fragmentary fossils because they belong to a geologic age, the Cretaceous, from which very few insect remains have ever been recovered. The Cretaceous was the time, ranging from 55 to 120 million years ago, when the last of the dinosaurs ranged the earth. Without much question, the air must have swarmed with insects then, as it did in ages before and has done in all times since. Yet entomologically speaking the Cretaceous is almost a blank page in the record of life on earth. For this reason the two fossil bits of bugs received from Colorado are all the more highly prized.

Science News Letter, April 3, 1937

GEOLOGY

Mammoth Hot Springs Show Increased Activity

THE terrace-building hot waters at Mammoth Hot Springs, Yellowstone National Park, are showing more activity than has been noted in recent years, Superintendent Edmund B. Rogers of the park states.

The Palette Spring, now considered the most beautiful of all the active springs at Mammoth, is spreading over a greater area than at any time during the past three years, with the result that the terraces are building up very rapidly at the top and to the east. The coloring of the spring is the most beautiful in recent years. The temperature of the water in the Palette Spring is 143 degrees Fahrenheit.

Mound Spring, with water at 149 degrees, is again playing spectacularly from numerous vents along the top of the terrace.

Angel Terrace, once one of the leading sights at Mammoth Hot Springs, has exhibited renewed activity with three new vents and a resultant increase in deposition of new travertine.

Cleopatra Spring, with a temperature of 158.5 degrees, has increased flow.

The temperamental Baby Spring, which developed on Prospect Terrace three or four years ago, is a little bubbler that changes every month, sometimes almost weekly. Occasionally it ceases entirely, then shows a new burst of activity. At present its terraces and basins are an average of two feet high and 50 feet in diameter. True to its vacillating nature, it went entirely dry during February, then started flowing a good-sized volume of water.

Science News Letter, April 3, 1937

SEISMOLOGY

Earthquake Was Off Lower California Coast

THE QUAKE that shook parts of California and adjoining states on Thursday, March 25, had its center off the coast of lower California, in approximately 31 degrees north latitude, 118 degrees west longitude, seismologists of the U. S. Coast and Geodetic Survey announced after studying data gathered telegraphically by Science Service. The shock, of moderate intensity, began at 8:48.8 a.m., Pacific standard time.

Observatories reporting were: Dominion Meteorological Observatory, Victoria, B. C.; the University of California, Berkeley, Calif.; St. Louis University, St. Louis, Mo.; University of Wisconsin, Madison, Wis.; Montana School of Mines, Butte, Mont.; the private laboratory of Mrs. M. M. Seeburger, Des Moines, Iowa; the U. S. Weather Bureau, Chicago; and the U. S. Coast and Geodetic Survey, Tucson, Ariz.

Science News Letter, April 3, 1937

METEOROLOGY

Eastern Cities End Lent Under Pall of Western Dust

WASHINGTON, and other cities of the Middle Atlantic seaboard, observed the end of Lent with a penitential sprinkling of dust, that came all the way from the nation's dust bowl in western Oklahoma. The dust came down the wind on Holy Thursday. On Good Friday a wailing gale swept it up and spread it all over again.

Science News Letter, April 3, 1937

GENERAL SCIENCE

Undogmatic Bible To Fuse World Culture Is Project

A NERVOUS network, a system of mental control about the globe, knitting all the intellectual workers of the world through a common interest and a common medium of expression into a more and more conscious co-operating unity and a growing sense of their own dignity, informing without pressure or propaganda, directing without tyranny.

The fertile and practical brain of H. G. Wells, whom the future will remember as a social scientist first and a teller of tales second, has suggested an international project to accomplish this broad objective. Before the famous Royal Institution of Great Britain he has outlined what he called World Encyclopedia, not a mere collection of books but a new social organ and a new institution. It would play "the role of an undogmatic Bible to a world culture."

The World Encyclopedia would consist of selections, extracts, quotations, very carefully assembled with the approval of outstanding authorities in each subject, carefully collated and edited and critically presented. It would be the mental background of every intelligent person in the world. It would be alive and growing and changing continually. Every fresh mind would feed it. It would be the standard source of material for the instructional side of school and college work. It would do, says Mr. Wells, what our scattered and disoriented intellectual organizations of today fall short of doing. It would hold the world together mentally.

In the long run, Mr. Wells believes, such a World Encyclopedia would prove a better investment for the time and energy of intelligent men and women than any definite revolutionary movement, Socialism, Communism, Fascism, Imperialism, Pacifism, or any other current isms.

Mr. Wells sees catastrophe ahead for mankind if it does not take thought to end its present mental indecisiveness. Never was a living species more perilously poised than ours at the present time, Mr. Wells believes. Our species may end its strange eventful history, he suggests, as just the last, the cleverest, of the great apes. "The great ape that was clever—but not clever enough. It could escape from most things but not from its own mental confusion."

Science News Letter, April 3, 1937

MOOSPHERE

From Page 215

claws on the larger creatures of its kin are in this one mere stubs ending futilely in bristles. But its antennae or feelers have grown out of all proportion, into long, beaded horns, with many long, whiplike branches. And at the other end of the creature are eight fantastic appendages that look like feathers—as if this creature of the sea had ambitions for the air!

But Frank Long does not confine his efforts to single specimens. Community life in the animal world catches his eye and his swift fingers picture scenes among our lesser cousins.

The simplest community, perhaps, is a colonial jellyfish. Here, strung along a winding cable of living stuff (represented in the model by a bent glass tube) are a dozen or more many-armed little animals. Each lives its own life, unable even to approach its neighbor; yet all share in peaceable communism one gas-filled float at the end of the string, that keeps the whole little community near the surface.

A more settled sea-community is shown in a bottom grotto of sea-anemones. Despite their name and their flower-like appearance, sea-anemones are animals. Their "petals" are really clutching fingers, wherewith they seize their prey when it swims too close.

Of all Mr. Long's pictures in glass, perhaps the one with the largest element of drama is a battle scene between two tribes of ants. The story is old, perhaps one of the best known in all natural history, and for that very reason most relished by the crowds of museum visitors. We see the onset of the attackers, fierce red Amazon ants. The defenders, black ants, fight valiantly for their home, but with their weaker jaws are no match for the raiders. The Amazons carry off their helpless young to be enslaved.

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Science News Letter, April 3, 1937

ARCHAEOLOGY

False Teeth Are Fitted to A Million-Year-Old Ape

Dental Plate Designed for Research Not for Use Is Shown to Scientists at Symposium on Early Man

FALSE teeth for a million-year-old ape were exhibited before prehistorians attending the International Symposium on Early Man at the Academy of Natural Sciences in Philadelphia.

It's ages too late to do the snaggel-tooth primate any good now, of course. But the beautifully made dental plate, including natural fossil teeth belonging to the real ape, serves the greater purpose of revealing man's evolution from ape-like form.

Discovery of jaws and teeth of a fossil ape found in the Siwalik hills of India opened up this new evidence on man's ancestry, Dr. William K. Gregory and Dr. Milo Hellman, of the American Museum of Natural History, told the Symposium.

Lower molar teeth of the Indian ape grew to form five cone-like points or cusps. As the cusps grew to mature size, grooves formed between them in shape of V or Y lines. This pattern of tooth is called the Dryopithecus pattern.

Dr. Gregory says:

"We think they represent the kind of molar teeth that belonged to the common ancestor of apes and man."

The common ancestor himself is still a missing link in evolution. But teeth of the Indian ape are so significant that the two specialists in anatomy said:

"We have in progress a re-study of the entire problem of origin of the dentition."

The ape's teeth are much below man's level, the scientists reported. But the subtle changing of the pattern in various

fossil apes and men traces evolutionary history. In man the Y-shaped groove has changed to a cross line between the four cusps that remain in advanced types.

Teeth of the Indian ape, discovered by two different expeditions and exhibited thousands of miles apart in the Indian Museum and in Yale University, are now proved to belong to the self-same individual ape.

When Dr. Hellman, former dentist, now anthropologist, tried to fit the fourteen teeth discovered, he saw that they belonged together, and that enough teeth were represented for him to make a dental-plate reconstruction of the ape's mouth. The portion of the teeth found by the Yale expedition are to be presented to the Indian Museum, so that the set may be kept there complete.

Evolutionary evidence carried by man in his teeth, the two anatomists believe, shows that early men of the Old Stone Age were structural ancestors to the curious types of Neandertal man on the one hand, and to modern man, *Homo sapiens*, on the other.



TEETH FOR AN APE

Dr. William K. Gregory, shows the plate containing fossil teeth of an ape.

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MISSING LINK

Dr. Robert Broom displaying the skull of a creature that had the brain of an ape, but the teeth of a man.

Ape Ate Like Man

Where, oh where, on man's family tree to hang an ape-brained creature with strangely human teeth?

This problem ape that ate like a man was thrust into the scientific limelight at the Symposium.

From South Africa, where it has rested in a cave for thousands of years, the extraordinary skull of this ape has emerged into a world that has living apes and living men, but not missing links like this.

Dr. Robert Broom of the Transvaal Museum in Pretoria reported his recent finding of the skull, and displayed a cast so that his fellow prehistorians might inspect the long, narrow chimpanzee type of skull with meager brain capacity, and human-like mouth.

Dr. Broom tentatively gives this ape the distinction of revealing a new species. It bears the name *Australopithecus Transvaalensis* Broom. It lived, he has reason to believe, about the middle of the Old Stone Age or even the latter part. And that is puzzling.

For by that time in prehistory, men were no novelty on earth. Various species of man had evolved and some had already become extinct. If this South African ape was on the way to human evolution, it must have started extremely late. And it never arrived. Dr. Broom told of unearthing the skull while he

was searching South African caves in hope of solving another ape puzzle. Twelve years ago, Prof. Raymond Dart had announced the startling discovery of this other ape, called the Taungs ape, which he considered the long-looked-for missing link, and a near common ancestor of ape and man.

"As the Taungs skull belonged to a child ape, four or five years old," said Dr. Broom, "this was not entirely convincing to the scientific world, and it seemed necessary if possible to get an adult specimen."

Comparing the Taungs skull to the one now revealed, Dr. Broom said:

"The skull is manifestly closely allied to the Taungs ape, but I am placing it in a new species because the associated mammals are all different, and I think later."

Dr. Broom expects to continue the search in caves at Sterkfontein. Before the year ends, he said, he hopes to have evidence which will settle the question of age, and to reveal a complete skeleton of the species.

Praising the Symposium at its close for drawing together the tangled threads of man's prehistory, Prof. George Grant MacCurdy of Yale University said that much progress is being made in a hard scientific task.

"Hardly a year has passed since 1895," said Prof. MacCurdy, "without an important discovery of the skeletal remains of fossil man. During the past 42 years the growth of our knowledge of fossil man's culture has also been unprecedented."

Stone Age Chewing Gum

Stone Age man chewed gum, it seems.

In the course of his address, Dr. V. Gordon Childe of the University of Edinburgh told of the discovery, in a peat bog near the Baltic, of lumps of conifer tree balsam apparently used for chewing, associated with the bone and stone weapons used in hunting and fishing just before the beginning of the New Stone Age.

First American Debated

Did the first American represent a mysterious and unknown pre-Indian race, or was he just a plain Indian red-skin? Did he manage to get here as early as 25,000 B.C., or as late as 2000 B.C., which is practically yesterday in terms of human history? Clashing scientific ideas enlivened the International Symposium.

Firing a shot for extremely late arrival of first Americans, Dr. Herbert J. Spinden, Brooklyn Museum, declared:

"My thesis is that the red man was the first human to enter America, and that he came bearing Neolithic (New Stone Age) arts, which represented the contemporary civilization of nomadic hunting and fishing tribes of northern Europe and northern Asia at the time of his departure."

This migration, which led Asiatics to cross Bering Strait and set foot on American soil, happened not much earlier than 2000 B.C., Dr. Spinden believes. It was so late that written history had already begun in civilized areas, and therefore American prehistory can be entirely fitted into sequences of the world's known history.

The fact that America's early people hunted mammoths, wild horses, and other Ice Age animals does not upset this theory, Dr. Spinden pointed out. Elephants have been found in China dating from a much later era than was supposed possible, and America, too, may have had its late-surviving Ice Age beasts.

Skeletons Known

Supporting Dr. Spinden's argument was the report of Dr. Ales Hrdlicka of the U. S. National Museum that every supposedly ancient skeleton found in America is of some known Indian type, and therefore presumably not very old.

Aligned on the side for early discovery of America, several geologists reported that man appears to have been in this country while the last ice sheet was retreating.

Dr. Kirk Bryan of Harvard told of studying the neighborhood where the only known home of Folsom Man has been located. This site in Colorado, where hunters cooked and ate Ice Age animals and worked at the Folsom type of stone weapon, is tentatively linked with the retreat of the Wisconsin ice sheet, but whether it should be called late glacial or post-glacial, Dr. Bryan said, will have to (Turn to page 222)

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ARCHAEOLOGY

Explorers Astonished—Mayas Buried Huge Jade Treasure

A 200-POUND boulder of jade—a sort of Cullinan Diamond of ancient America—has just been unearthed in ruins of a Mayan pyramid near Guatemala City by an expedition of the Carnegie Institution of Washington.

"We were astounded, for no piece of jade even remotely approaching this in size has ever been found in America before," declared Dr. A. V. Kidder, in charge of the excavations, reporting the discovery to the Institution.

The rough ball of jade bears scars where Mayan Indian workers had cut out slices of clear green stone for use in jewelry or ceremonial objects. Why the Indians then buried their treasure at

the very center of a pyramid stair is a mystery.

"The whole boulder was of good quality and might have represented a vast value," said Dr. Kidder. "Its burial was doubtless ceremonial; but what a sacrifice! Or, was it for protection, like the cache of gold in Kentucky?"

Modern scientists have searched without success for the natural source where American Indians got their much-treasured jade in Mexico or Central America. The American jade is similar to Oriental jade in appearance, but differs in chemical structure, and in range of coloring.

Science News Letter, April 3, 1937

PHYSICS

World's Highest Laboratory Now Open on Mt. Evans

THE CAMPUS of the University of Denver has been extended up to the peak of Mt. Evans at 14,259 feet. There, at the end of the highest automobile road in the United States, stands the highest laboratory in the world, being some three thousand feet higher than the famous laboratory on the Jungfrau Joch in Europe.

This laboratory is a joint project of the Massachusetts Institute of Technology and the University of Denver. The building was pre-fabricated in Denver, cut into sections and transported from Denver to Mt. Evans in one day by the use of a nine-truck caravan.

C.C.C. men did yeoman service in

carrying 40 sections averaging in weight from 200 to 500 pounds, up the rocky knoll from the terminus of the automobile road to the site of the laboratory. They also constructed the foundation for the building.

The laboratory is designed to withstand a wind velocity of 150 miles per hour and to screen out electrical disturbances of this region, which at times cause electric sparks to jump from one's finger-tips, ears, and nose, and make the hair stand out like the quills of a frightened porcupine. Also it had to be made as impervious and impregnable to rodents and souvenir-hunting tourists as possible.

To make the structure wind-proof, side walls were eliminated, while the protection from lightning was accomplished by having the end walls, the roof, and the floor completely surrounded with metal which is connected to ground wires buried deeply in the mountain. This also protects against rodents, but no satisfactory method has been found for protection against tourists.

The new laboratory is expected to be one of the sights which the hundreds of scientists attending the meeting of the American Association for the Advancement of Science next June 21-26 will wish to see.

● RADIO

April 6, 5:15 p.m., E.S.T.

KNIGHTS IN ARMOR—Steven V. Grancsay of the Metropolitan Museum of Art.

April 13, 5:15 p.m., E.S.T.

A DINOSAUR MONUMENT—Dr. Barnum Brown of the American Museum of Natural History.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

vancement of Science next June 21-26 will wish to see.

The need for such a laboratory in the United States has been felt for some time. There have been ten expeditions to Mt. Evans to study cosmic rays, and at least eight to Pike's Peak. The importance of this work is indicated by the fact that the only Nobel Prize winners in physics in the United States, viz.: Carl Anderson, R. A. Millikan, and A. H. Compton, have been among those making studies on Mt. Evans or Pike's Peak. Dr. Anderson has just recently been awarded the Nobel Prize for his work on cosmic rays, which led to the discovery of the positron. It is impossible to make the prolonged accurate observations at this altitude without the necessities for physical comfort and laboratory facilities for scientific work.

Use of the laboratory will not be limited to research work on cosmic rays. The first work done was that by Dr. Fred D'Amour of the Department of Zoology, who studied the physiological changes in the rat due to high altitude. The Department of Meteorology has long desired a station at high altitude where observers could be placed.

Requests to use the laboratory next summer have been received from cosmic ray workers at McGill University, Harvard University, and the University of Chicago. Requests from workers in other fields have been received from the Colorado State Museum, Colorado State College, and the University of Michigan.

Science News Letter, April 3, 1937

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ANATOMY-PHYSIOLOGY

Underfeeding at Early Age Causes Lifetime Undersize

Existence of Rings on Teeth Similar to Growth Rings Of Trees, And Telling of Health Conditions, Reported

SEVERE and prolonged underfeeding at an early age leaves its mark throughout life on body size. Full growth is never attained, no matter how much food is given after the early period of semi-starvation.

These conclusions, drawn from studies of rats, were reported by Dr. C. M. Jackson of the University of Minnesota at the meeting in Toronto of the American Association of Anatomists.

The rats were underfed to keep them at the same constant weight from the time of weaning until they reached the age of 18 weeks. Mortality was high, Dr. Jackson reported.

The survivors, fed as much as they wanted to eat of the stock diet, grew rapidly at first and then more slowly, but never caught up to their litter mates that had not had the preliminary underfeeding. At death, the underfed rats were shorter and weighed less than normal but had nearly normal weight brains, pituitary glands, stomachs, intestines, hearts, lungs, kidneys and sex organs. Bones, muscles, livers, spleens and certain other body structures were below normal weight.

Teeth Rings

Teeth have rings and other microscopic marks that tell secrets of a person's growth and health, Dr. Isaac Schour of the University of Illinois College of Dentistry reported.

Every tooth has its growth rings, something like the growth rings that tell the age of trees, Dr. Schour has discovered. Teeth rings, or other marks, however, tell also the story of glandular disturbances, vitamin lack and other conditions affecting the health of an individual. A special tooth ring, called the neonatal ring, marks the birth of an individual.

Teeth start growing before birth and continue growing until the age of 20 years in man, and corresponding ages in other animals. They constitute a permanent record, it appears from Dr. Schour's research, of health and growth.

The teeth rings are not visible to the naked eye. Special staining makes them

visible under microscope. The rings are formed both in the enamel and the dentin of teeth. Dr. Schour found them in all species he studied, from rat to man.

A growth ring is added every 24 hours in the lower animals and every 96 hours in man and macacus monkeys.

Pulp Registers Pain

The pulp, soft inner part of a tooth, is concerned mainly with painful sensations, Dr. Alton D. Brashear of Louisiana State University concluded after studying nerve structure in human and cat teeth. The organ of touch for the tooth, his studies showed, is probably located in the peridental tissues, which are between the root of the tooth and the socket in the jaw.

Science News Letter, April 3, 1937

HEREDITY

Bone Changes in Rickets Have Hereditary Basis

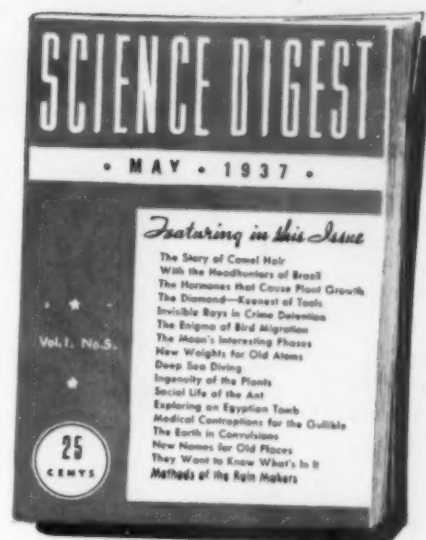
HEREDITY plays a part in causing the bone changes seen in rickets, it appears from studies reported by Dr. George L. Streeter, of the Carnegie Institution of Washington, to the American Association of Anatomists.

Rickets itself, of course, is not inherited. It is caused by faulty diet, lack of vitamin D being the specific cause. When a child gets rickets his bones do not develop properly. Extreme degree of this faulty bone development is seen in the bow-legs and bulging foreheads of some rachitic children.

The tendency to abnormal bone development in rickets is inherited, Dr. Streeter found in the course of his studies, which were made with the cooperation of Dr. E. A. Park and Deborah Jackson of the Johns Hopkins University. The studies were made with two strains of rats, one of which was much more vulnerable to rickets than the other. The vulnerable strain reacted more severely to a rickets-causing diet than the non-vulnerable strain.

Science News Letter, April 3, 1937

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MEDICINE

Artificial Siamese Twins Show Role of Sex Hormones

Pairs of Mice Joined by Surgery to Have Single Blood Supply Throw Light on Cancer Causation

PAIRS of male and female mice, joined Siamese-twin fashion by surgical operation so that they had a common blood supply, have helped to identify the sex hormone that might play a part in breast cancer causation. The studies were reported by Dr. William S. Murray, of the New York State Institute for the Study of Malignant Disease, Buffalo, at the meeting of the American Association for Cancer Research in Chicago.

One of the female sex hormones, the luteal fraction of the ovarian hormone, is the hormone that may lead to the formation of breast cancer in mice, it appears from Dr. Murray's studies.

Scientists had previously found that the ovarian hormones, acting upon or accumulating in the breast tissues of mice, upset the balance between the various hormones in the body, and instigate the formation of cancers. Whether it was the amount or the kind of sex hormone that led to cancer formation was the question Dr. Murray set himself to solve with the paired male and female mice. Male mice of the strain he studied never developed breast cancer. In breeding females of the strain, breast cancer appeared in from 65 per cent. to 100 per cent. under the stimulation of the hormones of oestrus, pregnancy and lactation, whereas in virgin females the ovarian hormones producing oestrus caused breast cancer in only 50 per cent. of the mice.

By pairing the male and female mice

so that they had a common blood supply, both came under the influence of the same amount and kind of sex hormones, both male and female. Introduction of the male hormones into the blood stream of the females upset the sexual cycle in the females. The ovaries were stimulated to precocious development of follicles which degenerated so that no luteal tissue or hormone was formed. Neither males nor females developed breast tumors. Since the luteal fraction of the ovarian hormone was absent, Dr. Murray concludes that this is the hormone that plays a role in the development of breast cancer in mice.

New Cancer Yardstick

A new yardstick for distinguishing between three cancer-like diseases, which takes a leaf from the book of statisticians who study birth rates in populations, was reported at the meeting of the American Association for Cancer Research by Dr. Albert E. Casey of St. Louis University.

Just as excessive birth rates may bring difficulties to a whole continent like Europe through population pressure, so too, pointed out Dr. Casey, the excessive birth rate of cancer cells is an index to the degree of malignancy in cancerlike diseases such as lymphosarcoma, lymphatic leukemia and Hodgkin's disease.

Death from cancer, finds Dr. Casey by his new method, is in direct proportion to the cancer cells' birth rate. Tumors with low cell birth rate almost never spread to other parts of the body and never cause death except by accident of location.

Swift-growing tumor cells, however, tend to run over into neighboring territories just as nations with a high birth rate tend to seek more room by territorial expansion.

Dr. Casey's analysis of the three diseases based on this population birth rate idea show lymphosarcoma has a high cellular birth rate and—as in real life—a high death rate from the affliction. Tissues from cases of lymphatic leukemia look almost like lymphosarcoma under a microscope but have a low birth rate.

This disease, concludes Dr. Casey, is a harmless tumor growth of the lymph tissues but is not infectious or malignant. Hodgkin's disease has a low birth rate in its cells and there is no evidence that this condition is true cancer.

Science News Letter, April 3, 1937

ORNITHOLOGY

Migratory Bird Treaty With Mexico Ratified

WITH the exchange of ratifications of the Mexico-U. S. migratory bird treaty, and the already existing treaty with Canada, North America rounds out a safety-for-birds policy that holds from the Arctic Ocean to the boundaries of Central America.

International agreements are established regulating the maximum length of shooting seasons, prohibiting all shooting whatever during spring and summer, and designating permanently closed sanctuary areas. Neither game birds nor mammals, dead or alive, may be transported across the Mexican border without a permit from the government of each country.

A large list of bird families receives the benefits of protection under the treaty. It includes not only game birds like ducks, geese, snipe, and pigeons, but also small songbirds such as mockingbirds, finches, thrashers, and buntings.

The Bureau of Biological Survey, U. S. Department of Agriculture, has worked patiently for many years to bring this agreement to pass. Conservationists and sportsmen alike have expressed gratification over the consummation of the treaty.

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be determined by figuring the stages of retreat of glaciers in the Rockies and Middle West.

To add to complexity of the problem, Dr. E. B. Renaud of the University of Denver reported finding 3,700 pieces of worked stone, representing early American handiwork crude and primitive and closely like various stages of the Old World's really ancient stone arts. These implements, found on the surface at 40 sites, are not believed by Dr. Renaud to be as old as Europe's Dawn Men or other types several hundred thousand years old, but they apparently show America's earliest inhabitants in a new light, as people who did cruder work on occasion than has been associated with them before.

Science News Letter, April 3, 1937

VITALISM and MECHANISM A DISCUSSION

between
HERBERT V. NEAL
Professor of Zoology, Tufts College
and
JAMES F. PORTER

Disclosing some aspects of the still existing
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SHERMAN M. GOBLE
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ORNITHOLOGY

NATURE RAMBLINGS

by Frank Thone



Gizzard Grotesqueries

QUEER things have been found in birds' stomachs by Miss Phoebe Knappen of the U. S. Biological Survey, who has examined the contents of thousands of them collected for scientific purposes. Her catalogue of odds and ends that had been swallowed by birds reads almost like the tale of a small boy's pocket.

Some of the things she has found are of course simply byproducts of things swallowed by the birds in regular line of business. American cuckoos, for example, are great eaters of hairy caterpillars, so their stomachs are often found stuffed with bristles. Owls eat mice, and the wads of indigestible stuff ("pellets", ornithologists call them) which they regurgitate contain large quantities of mouse bones and skin. One winter's collection of owl pellets left by one pair of barn owls that live in a Smithsonian Institution tower yielded well over 200 mouse skulls.

But the real, unexpected oddities turn up in largest variety in the stomachs of garbage-eating birds, like gulls and crows, and to a secondary extent in birds of prey like hawks and eagles. Small birds, though, sometimes bring astonishing contributions. Ducks, too, are remarkable catch-alls.

Garbage items have included such things as cooked fish, meat, and vegetables, peanuts, tomato seeds, hair, rubber bands, and string. Paper, oddly enough, is apparently seldom eaten. Miss Knappen explained the discovery last fall of tropical papaya seeds in the stomach of a southbound duck on the garbage basis; the duck had evidently picked up the remains of somebody's lunch.

Chunks of rock are often swallowed by birds, even those that do not ordi-

narily use gravel. Among the strange minerals that have been found are such things as furnace slag and coral. One seaside bird had swallowed part of the rib of a seal.

Some of these meals of junk turn out to be suicidal. One dead eagle's stomach contained a large fish-hook. The poisoning of ducks by shoveling up quantities of lead shot, or scraps of phosphorus from exploded bombs at the Army Proving Grounds, was noted not long ago. The lead-poisoning from spent shotgun ammunition is still a difficult problem for the custodians of our wild waterfowl.

Science News Letter, April 3, 1937

RADIO

Battle for Radio Waves Foreseen For Future

THERE may be no galloping ponies and covered wagons lined up at the starting line as there were on April 22, 1889, when Oklahoma territory was thrown open to homesteaders, but the race is now on for the allotment of one of the last American frontiers.

This frontier is a great natural resource; the yet unused radio frequencies between 30 and 200 megacycles. In wavelengths the range is from one and a half to ten meters.

The Federal Communications Commission—watchdog of these untapped radio waves—has been permitting scientific scouting parties to enter the territory on experimental licenses. Experimental television in New York and Philadelphia has thus been achieved.

But the government too, particularly the Bureau of Air Commerce, has been testing the possibilities of the new radio region and for more than 18 months has been operating teletype machines in Washington by radio signals coming from Baltimore. Perfect 24-hour reception through all kinds of static has been demonstrated.

What that means to commercial aviation safety can be realized. Improved radio beacons and markers, anti-collision devices and a superior weather report transmitting system are only a few possibilities. It costs the government some \$382,000 a year to lease the telegraph wires now used to send its aviation weather reports and the hope would be to reduce markedly this expense.

In the offing also are the other governmental agencies, the Army, Navy, Coast Guard and other similar organizations with communications systems which could use the new radio region.

What the new leadership in the Bureau of Air Commerce will do with the projected communications plans may decide the battle now under way between government and private business. But whichever way it comes out the FCC will make some enemies.

Science News Letter, April 3, 1937

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•First Glances at New Books

Meteorology

WEATHER RAMBLE—W. J. Humphreys—*Williams & Wilkins*, 265 p., illus., \$2.50. The veteran professor of the physics of the air, U. S. Weather Bureau, in another of his charmingly discursive little books tells of all manner of strange weather behaviors, from ice ribbons to tornadoes, and of the equally strange though usually unregarded factors and forces that lie behind the commoner phenomena like rain and wind.

Science News Letter, April 3, 1937

Chemistry—Biography

THE CHEMICAL WHO'S WHO: Vol. II, 1937—Williams Haynes, ed.—*Haynes & George Co.*, 543 p., \$6. Since the appearance of the first volume, issued in 1928 under the title, "Who's Who in the Chemical and Drug Industries", the scope of the work has been slightly changed, to include all possible names in the chemical field proper, but omitting many names from the medical and cosmetic industries. A geographical index, and a company index add to the usefulness of the volume.

Science News Letter, April 3, 1937

Photography

HOW TO USE YOUR CANDID CAMERA—Ivan Dmitri—*Studio Publications*, 56 p., illus., \$3.50. Advice for the candid camera enthusiast, and 56 beautiful examples of candid photography which give details of lenses, exposures and lighting conditions that are so essential.

Science News Letter, April 3, 1937

Mathematics

ANALYTIC GEOMETRY AND CALCULUS (2d ed.)—Bolling H. Crenshaw and Cincinnatus D. Killebrew; rev. by Ralph D. Doner—*Blakiston's*, 222 p., \$2.75. Text used at Alabama Polytechnic Institute which shaves the course to its barest essentials so that it may fit in the time requirements of that particular school.

Science News Letter, April 3, 1937

Ichthyology

KEYS TO THE FISHES OF WASHINGTON, OREGON, AND CLOSELY ADJOINING REGIONS—Leonard P. Schultz—*Univ. of Wash.*, 124 p., illus., 75c.

Science News Letter, April 3, 1937

Conservation

ADVENTURES IN BIRD PROTECTION, AN AUTOBIOGRAPHY—Thomas Gilbert Pearson—*Appleton-Century*, 459 p., plates, \$3.50. The president-emeritus of the National Association of Audubon Societies

tells of his battles on a thousand fronts, from the committee rooms of Congress to the swamps of the South, remembers appreciatively doughty fellow-campaigners from the ranks of both scientists and sportsmen. Events are brought down to date with the merging of the conservation activities of many organizations in the new American Wildlife Institute.

Science News Letter, April 3, 1937

Gardening

GARDENING: A COMPLETE GUIDE TO GARDEN MAKING INCLUDING FLOWERS AND LAWNS, TREES AND SHRUBS, FRUITS AND VEGETABLES, PLANTS IN THE HOME AND GREENHOUSE—Montague Free—*Harcourt, Brace*, 550 p., illus., \$3.50. A one-volume library by the horticulturist of the Brooklyn Botanic Garden, outlining basic principles, listing suitable plants with brief annotations on habits and properties, giving detailed information about fertilizers, propagation, protection against weather extremes, and a host of other things the home gardener will want to know.

Science News Letter, April 3, 1937

Natural History

THROUGH THE WOODS, THE ENGLISH WOODLAND—APRIL TO APRIL—H. E. Bates—*Macmillan*, 142 p., 73 wood engravings, \$3. Evident is the love of this Englishman for the charm of England's countryside: flowers and foxes, oaks and nightingales. But he does not like Keepers—and with good reason.

Science News Letter, April 3, 1937

Chemistry

THE COLLOIDAL STATE: II, Aqueous Solutions of Paraffin-Chain Salts, A Study in Micelle Formation—G. S. Hartley, 69 p., 15 fr.; III, The Sol-Gel Transformation—Erich Heymann, 68 p., 15 fr.—*Hermann & Cie, Paris*.

Science News Letter, April 3, 1937

Chemistry

LEÇONS DE CHIMIE ANALYTIQUE: I, Mesure des Volumes Liquides Liqueurs Titrés, Alcalimétrie, 60 p., 12 fr.; II, Acidimétrie, 31 p., 8 fr.; III, Argentométrie, 27 p., 8 fr.; IV, Manganométrie et Chromométrie, 44 p., 10 fr.; Idométrie et Arsenométrie, 52 p., 12 fr. Alcide Jouniaux—*Hermann & Cie, Paris*.

Science News Letter, April 3, 1937

Geography

PHYSICAL GEOGRAPHY (New Ed.)—John Thornton, rev. by L. Dudley Stamp—*Longmans, Green*, 248 p., illus., \$1.75.

Science News Letter, April 3, 1937

Entomology

THE INSECT MAN—Eleanor Dooley—*Appleton-Century*, 180 p., illus., \$1.50. The eternally fascinating story of Fabre, retold compactly but with close attention to essential continuity and a judicious amount of focus on the highlights.

Science News Letter, April 3, 1937

Nature Study

BEAVER PIONEERS—Wendell and Lucie Chapman—*Scribner's*, plates, \$2. The story of Notchtail and her mate Blackface, their family and their tragic fate at the hands of poachers. A great deal of beaver biology is woven into this fictionalized account, and there are many excellent photographic illustrations.

Science News Letter, April 3, 1937

Coast Defense

COAST GUARD TO THE RESCUE—Karl Baarslag—*Farrar & Rinehart*, 328 p., \$2.50. With boats small and large, latterly with planes, always with tough muscle and steady nerve, the Coast Guard, Uncle Sam's "other navy", has from the early days of the Republic carried on the double task of old-time knighthood: to befriend and rescue those in distress, to combat evildoers. Baarslag's book records straight facts that are as exciting as fiction.

Science News Letter, April 3, 1937

Chemistry

LABORATORY METHODS OF ORGANIC CHEMISTRY—L. Gattermann; rev. by Heinrich Wieland; tr. by W. McCartney—*Macmillan*, 435 p., illus., \$4.50. This book is in its 24th German edition and has been a standard in that nation for some thirty and more years. American teachers of chemistry will welcome the English translation.

Science News Letter, April 3, 1937

Natural History

NATIONAL NATURE NEWS, Vol. 1, No. 1, March 15, 1937—*Pub. weekly, at 3107 Wisconsin Ave., Washington, D. C.*, 8 p., \$2 per year. A new nature magazine, edited by Mrs. Lillian Cox Athey, who already has a well-established reputation in the nature-writing field, particularly as author of books for school use. This new venture will have the advantages that weekly publication offers: adaptability to current events (which have a trick of not following the calendar), the "news" atmosphere that even the most attractive book cannot have, stimulus through frequent arrival to frequent reading.

Science News Letter, April 3, 1937